

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): An image encoding apparatus comprising:

conversion means for converting ~~[[a]]~~ coding target ~~[[block]]~~ blocks within a coding target image into conversion information;

quantization means for quantizing the conversion information and generating quantized conversion information; and

encoding means for generating compression data by encoding the quantized conversion information based on ~~predetermined entropy encoding rules~~ the size of the blocks, and for generating a compression code used to generate the compression data, wherein

the encoding means encodes the quantized conversion information based on a plurality of sizes of the blocks, and generates the compression code corresponding to each size of the blocks, and

~~encodes the block size, into which the coding target image is divided, and generates compressed block size information which~~ the block size and compression code corresponding ~~the lowest bit rate~~ is included in a header information, and the entropy encoding rules are ~~switched according to the block size.~~

Claim 2 (Currently Amended): An image encoding apparatus according to claim 1, further comprising dictionary storage means for storing a plurality of bases, wherein

the conversion means converts the coding target image into the conversion information including index information for specifying a basis used for decomposition of the coding target image among the plurality of bases, a coefficient by which the basis specified by the index information is multiplied, and positional information for specifying a position

where a pattern made by multiplying the basis specified by the index information by the coefficient is restored, based on a predetermined conversion rule,

the encoding means generates the compression data including ~~[[a]]~~ the compression codes ~~code made by encoding the quantized conversion information generated by the quantization means~~ based on a predetermined compression encoding rule, and

for each block size, the encoding means executes processing in which the encoding means divides the coding target image into ~~[[a]]~~ the plurality of blocks, extracts, for each of the plurality of blocks, the quantized conversion information the positional information of which is included in the block, encodes, for each of the plurality of blocks, a flag for specifying existence of the quantized conversion information the positional information of which is included in the block, encodes, for each of the plurality of blocks, the number of items of quantized conversion information each of which includes the positional information included in the block, converts the positional information of the quantized conversion information into inter-block positional information specifying a relative position in the block in which the positional information is included, and encodes the quantized conversion information, ~~while changing size of the block, whereby the encoding means generates a plurality of compression codes, and includes a code relating to size of the block in which a bit rate of the compression code becomes at a minimum and the compression code generated at the size in the compression data.~~

Claim 3 (Currently Amended): An image encoding method including:

~~a conversion step in which conversion means converts~~ converting ~~[[a]]~~ coding target ~~[[block]]~~ blocks within a coding target image into conversion information;

~~a quantization step in which quantization means quantizes~~ quantizing the conversion information and generates generating quantized conversion information; and

~~an encoding step in which encoding means generates~~ generating compression data by encoding the quantized conversion information based on ~~predetermined entropy encoding rules~~ the size of the blocks, and generating the compression code corresponding to each size of the blocks, and

~~wherein, in the encoding step, the encoding means encodes the block size, into which the coding target image is divided, and generates compressed block size information which is included in a~~ including in header information the block size and compression data ~~corresponding to the lowest bit rate, and the entropy encoding rules are switched according to the block size.~~

Claim 4 (Currently Amended): An image encoding method according to claim 3, wherein,

[[in]] the conversion step, ~~the conversion means converts~~ further includes converting the coding target image, based on a predetermined conversion rule, into the conversion information including index information for specifying a basis used for decomposition of the coding target image among a plurality of bases stored in dictionary storage means, a coefficient by which the basis specified by the index information is multiplied, and positional information for specifying a position where a pattern made by multiplying the basis specified by the index information by the coefficient is restored,

[[in]] the encoding step, ~~the encoding means generates~~ further includes generating the compression data ~~including a compression code made by encoding the quantized conversion information generated by the quantization means~~ based on a predetermined compression encoding rule, and

for each block size, the encoding means executes processing in which the encoding means divides dividing the coding target image into [[a]] the plurality of blocks, extracts

extracting, for each of the plurality of blocks, the quantized conversion information the positional information of which is included in the block, ~~encodes~~ encoding, for each of the plurality of blocks, a flag for specifying existence of the quantized conversion information the positional information of which is included in the block, ~~encodes~~ encoding, for each of the plurality of blocks, the number of items of quantized conversion information each of which includes the positional information included in the block, ~~converts~~ converting the positional information of the quantized conversion information into inter-block positional information specifying a relative position in the block in which the positional information is included, and ~~encodes~~ encoding the quantized conversion information, ~~while changing size of the block, whereby the encoding means generates a plurality of compression codes, and includes a code relating to size of the block in which a bit rate of the compression code becomes at a minimum and the compression code generated at the size in the compression data.~~

Claim 5 (Currently Amended): An image encoding method according to claim 4, wherein

the quantization ~~means quantizes~~ step further includes quantizing the coefficient included in the conversion information to generate the quantized conversion information including a quantized coefficient,

when encoding the quantized conversion information ~~in said processing, the encoding means extracts~~ includes extracting a minimum absolute value among absolute values of the quantized coefficients included in a plurality of items of quantized conversion information, ~~includes~~ determining a code relating to the minimum absolute value in the compression data, ~~converts~~ converting each of the quantized coefficients into a differential value between the absolute value for each of the quantized coefficients and the minimum absolute value,

~~includes including~~ the differential values in the compression code after encoding, and
~~includes including~~ a positive or negative sign for each of the quantized coefficients in the compression code after encoding.

Claim 6 (Currently Amended): An image encoding method according to claim 4, wherein, ~~[[in]]~~ the encoding step, ~~the encoding means uses~~ further comprises using arithmetic coding as the predetermined compression encoding rule and ~~executes~~ executing the arithmetic coding by using ~~[[a]]~~ predetermined ~~probability~~ probabilities stored in a table ~~being having~~ different values according to the size of the block.

Claim 7 (Currently Amended): ~~An image encoding program making a computer function as~~ A computer readable medium encoded with computer executable instructions for encoding an image, said set of computer executable instructions causing the computer to perform steps, comprising:

~~conversion means for~~ converting ~~[[a]]~~ coding target ~~[[block]]~~ blocks within a coding target image into conversion information;

~~quantization means for~~ quantizing the conversion information and generating quantized conversion information; and

~~encoding means for~~ generating compression data by encoding the quantized conversion information based on ~~predetermined entropy encoding rules~~ the size of the blocks, and generating a compression code used to generate the compression data, wherein

the encoding ~~[[means]]~~ step further comprises encoding the quantized conversion information based on a plurality of sizes of the blocks, and generating the compression code corresponding to each size of the blocks, and

~~encodes the block size, into which the coding target image is divided, and generates compressed block size information which the block size and compression code corresponding the lowest bit rate is included in a header information, and the entropy encoding rules are switched according to the block size.~~

Claim 8 (Currently Amended): An image decoding apparatus comprising:

decoding means for decoding block size information included in a header, and for generating quantized conversion information by decoding compression data based on predetermined entropy decoding rules the decoded block size information;

inverse quantization means for inversely quantizing the quantized conversion information and generating conversion information; and

inverse conversion means for inversely converting the conversion information into ~~[[a]]~~ decoding target ~~[[block]]~~ blocks within a decoding target image;

~~wherein the decoding means decodes compressed block size information which is included in a header information and generates the block size, into which the decoding target image is divided,~~

~~and the entropy decoding rules are switched according to the block size.~~

Claim 9 (Currently Amended): An image decoding apparatus according to claim 8, further comprising:

dictionary storage means for storing a plurality of bases, wherein

the decoding means decodes the compression data including a compression code made by encoding the quantized conversion information, based on a predetermined decoding rule, the quantized conversion information being made by quantizing the conversion information which is made by conversing the decoding target image, based on a

predetermined conversion rule, into index information to a basis used for decomposition of the decoding target image among the plurality of bases, a coefficient by which the basis specified by the index information is multiplied, and positional information for specifying a position where a pattern made by multiplying the basis specified by the index information by the coefficient is restored,

the inverse conversion means generates the decoding target image from the conversion information by using the plurality of bases stored in the dictionary storage means, ~~[[base]]~~ based on a predetermined inverse conversion rule,

the compression data includes a code relating to the size of blocks into which the decoding target image is divided, and the positional information included in the conversion information is made to be inter-block positional information specifying a relative position in the block in which the positional information is included, and

the decoding means refers to the code relating to the size of the block included in the compression data and converts the inter-block positional information included in the conversion information into the positional information specifying a position in the decoding target image.

Claim 10 (Currently Amended): An image decoding method including:

~~a decoding step in which~~ decoding block size information included in a header, and
~~means generates~~ generating quantized conversion information by decoding compression data based on ~~predetermined entropy decoding rules~~ the decoded block size;

~~an inverse quantization step in which inverse quantization means~~ inversely quantizes quantizing the quantized conversion information and generating conversion information; and

~~an inverse conversion step in which inverse conversion means inversely convertes~~
converting the conversion information into a decoding target block within a decoding target image;

~~wherein, in the decoding step, the decoding means decodes compressed block size information which is included in a header information and generates the block size, into which the decoding target image is divided, and~~

~~the entropy decoding rules are switched according to the block size.~~

Claim 11 (Currently Amended): An image decoding method according to claim 10, wherein,

[[in]] the decoding step, ~~the decoding means decodes~~ further comprises decoding compression data including a compression code made by encoding the quantized conversion information, based on a predetermined decoding rule, the quantized conversion information being made by quantizing the conversion information which is made by conversing the decoding target image, based on a predetermined conversion rule, into index information to a basis used for decomposition of the decoding target image among a plurality of bases, a coefficient by which the basis specified by the index information is multiplied, and positional information for specifying a position where a pattern made by multiplying the basis specified by the index information by the coefficient is restored,

[[in]] the inverse conversion step, ~~the inverse conversion means generates~~ further comprises generating the decoding target image from the conversion information by using the plurality of bases stored in dictionary storage means, based on a predetermined inverse conversion rule,

the compression data includes a code relating to the size of blocks into which the decoding target image is divided, and the positional information included in the conversion

information is made to be inter-block positional information specifying a relative position in the block in which the positional information is included, and

[[in]] the decoding step, ~~the decoding means refers~~ further comprises referring to the code relating to the size of the block included in the compression data and ~~converts~~ converting the inter-block positional information included in the conversion information into the positional information specifying a position in the decoding target image.

Claim 12 (Currently Amended): An image decoding method according to claim 11, wherein

the quantized conversion information includes a quantized coefficient being made by quantizing the coefficient,

the compression data includes the compression code made by encoding a code relating to a minimum absolute value among absolute values of the quantized coefficients included in a plurality of items of quantized conversion information, differential values between the absolute values of the quantized coefficients and the minimum absolute value, and a positive or negative sign of the quantized coefficients, and

[[in]] the decoding step, ~~the decoding means adds~~ further comprises adding the minimum absolute value to each of the differential values included in the plurality of items of quantized conversion information generated by decoding the compression data with reference to a code relating to the minimum absolute value, and [[gives]] giving the positive or negative sign included in the quantized conversion information to an added value.

Claim 13 (Currently Amended): An image decoding method according to Claim 11, wherein

the compression code included in the compression data is generated by encoding with arithmetic coding ~~in which a~~ according to predetermined probability probabilities stored in a table ~~[[being]]~~ having different values according to the size of the block ~~[[is]]~~ used as ~~[[the]]~~ a predetermined compression encoding rule, and

~~[[in]] the decoding step, the decoding means executes further comprises executing~~ inverse arithmetic coding based on the predetermined decoding rule by using the predetermined probability table according to the size of blocks into which the decoding target image is divided.

Claim 14 (Currently Amended): ~~An image decoding program making a computer function as~~ A computer readable medium encoded with computer executable instructions for decoding an image, said set of computer executable instructions causing the computer to perform steps, comprising:

~~decoding means~~ decoding block size information included in a header, and ~~[[for]]~~ generating quantized conversion information by decoding compression data based on ~~predetermined entropy decoding rules~~ the decoded block size information;

~~inverse quantization means for~~ inversely quantizing the quantized conversion information and generating conversion information; and

~~inverse conversion means for~~ inversely converting the conversion information into ~~[[a]]~~ decoding target ~~[[block]]~~ blocks within a decoding target image;

~~wherein the decoding means decodes compressed block size information which is included in a header information and generates the block size, into which the decoding target image is divided,~~

~~and the entropy decoding rules are switched according to the block size.~~